EOS Production Sites
Network Performance Report: January 2015

This is a monthly summary of EOS network performance testing between production sites – comparing the measured performance against the requirements. Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.

Highlights:

- **Very stable flows**
  - **GPA: 3.64** ↑ (was 3.61 last month)
- **Requirements**: using the Network Requirements Database for 2014
  - Including GPM, OCO2, and SMAP missions
  - MODIS and AMSR Reprocessing requirements included
- **Only 2 flows below Good**
  - **GSFC → EROS: Almost Adequate**
  - **NOAA → GSFC-NPP-SD3E: Low**
    - Probably just a problem with the NOAA test node

Ratings Changes:

Upgrade: ↑ GSFC → EROS: Low → Almost Adequate

Downgrades: ↓ None

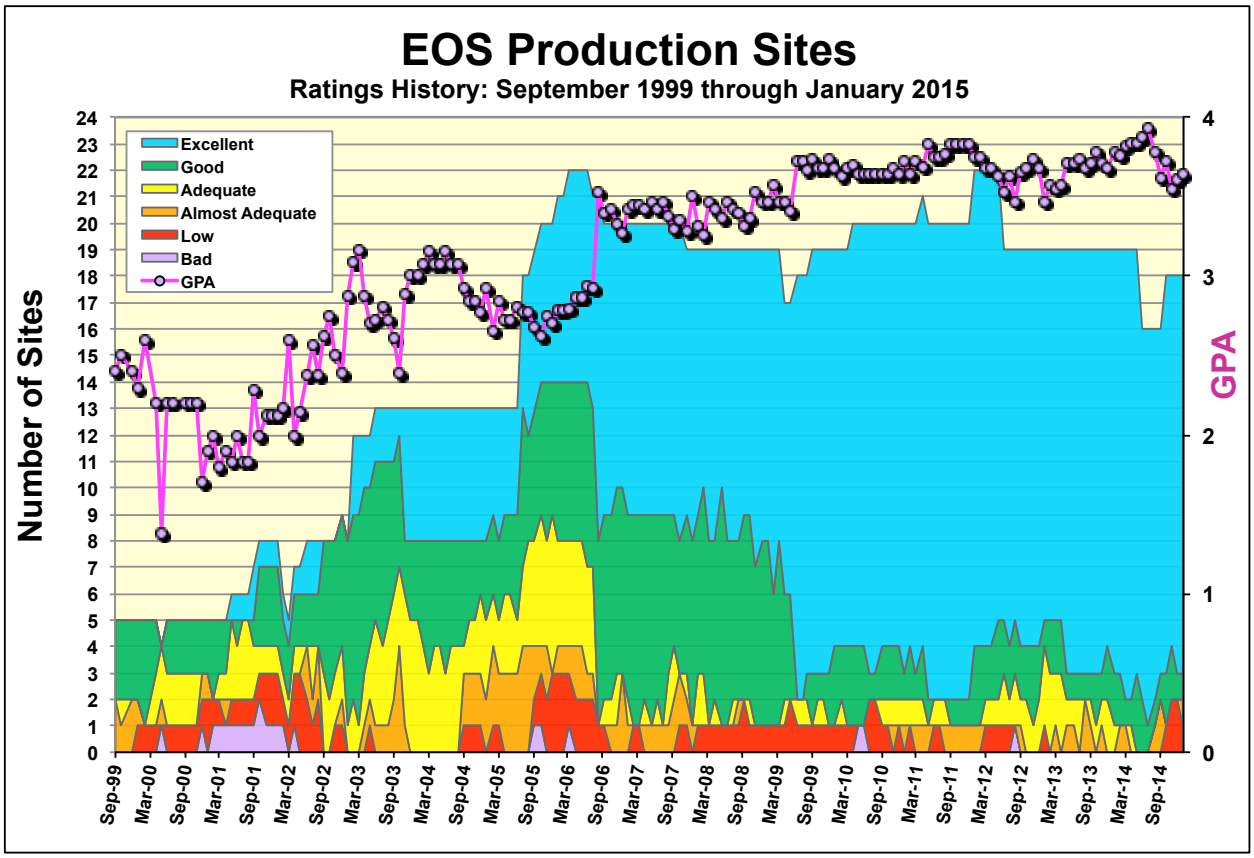
Ratings Categories:

Rating	Value	Criteria
Excellent:	**4**	**Total Kbps** > Requirement * 3
Good:	**3**	1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate:	**2**	Requirement < **Total Kbps** < Requirement * 1.3
Almost Adequate:	**1.5**	Requirement / 1.5 < **Total Kbps** < Requirement
Low:	**1**	Requirement / 3 < **Total Kbps** < Requirement / 1.5
Bad:	**0**	**Total Kbps** < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that "**Almost Adequate**" implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:



The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

2011 April: Added RSS to GHRC
2011 May: Deleted WSC to ASF for ALOS
2012 January: Added NOAA → GSFC-SD3E
Added GSFC-SD3E → Wisconsin
2012 June: Deleted GSFC → LASP
Deleted GSFC ← → JAXA
2014 June: AMSR-E no longer producing data
Deleted JPL to RSS and RSS to GHRC
Deleted JPL to NSIDC
2014 October: Added JPL to NSIDC requirement for SMAP
Added GSFC to GHRC requirement for LANCE

Requirements Basis:

In June 2014, the requirements were updated to the latest values in the database!

- Added flows for GPM, OCO2, and SMAP (effective FY '15) missions
- Removed AMSR-E, ICESAT flows (AMSR-E reprocessing remains includes)
- MODIS reprocessing incorporated month-by-month
    - Reprocessing requirement began 2014 August

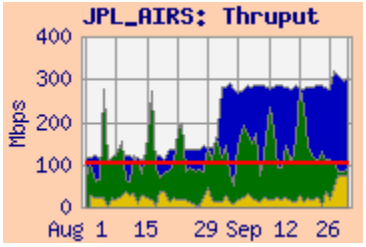
In June 2012, the requirements were switched, to use the EOSDIS network requirements database.

Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

Integrated Charts:



Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow".

The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf thruput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation.

The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.

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Network Requirements vs. Measured Performance

January 2015		Requirements (mbps)		Testing				Ratings	
Source ➔ Destination	Instrument (s)	Current FY '15	Old FY '12	Source ➔ Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re FY '15 Requirements: This Month	Ratings re FY '15 Requirements: Last Month
GSFC ➔ EROS	MODIS, LandSat	1016.2	548.4	MODAPS-PDR ➔ EROS LPDAAC	24.2	683.8	683.8	A A	Low
GSFC ➔ JPL	AIRS, MLS, NPP, TES, OCO2, SMAP	121	63.0	NPP SD3E OPS1 ➔ JPL-AIRS	201.4	668.1	768.4	Excellent	Ex
JPL ➔ GSFC	MLS, OCO2	11.9	0.57	JPL-PODAAC ➔ GSFC GES DISC	10.6	569.4	569.4	Excellent	Ex
LaRC ➔ JPL	TES, MISR	83.5	83.5	LARC-ANGe ➔ JPL-TES	15.3	344.0		Excellent	Ex
JPL ➔ LaRC	TES	1.1	1.1	JPL-TES ➔ LARC-PTH	0.94	791.9	791.9	Excellent	Ex
GSFC ➔ LaRC	CERES, MISR, MOPITT, TES, MODIS	60.7	52.2	GSFC EDOS ➔ LaRC ASDC	42.8	895.8	897.7	Excellent	Ex
LaRC ➔ GSFC	MISR	0.6	0.6	LARC-ASDC ➔ GES DISC	0.59	933.9	933.9	Excellent	Ex
JPL ➔ NSIDC	AMSR-E, SMAP	17.1	0.16	JPL-SMAP ➔ NSIDC	0.0007	750.0		Excellent	Ex
NSIDC ➔ GSFC	AMSR-E, MODIS, ICESAT	0.009	0.017	NSIDC DAAC ➔ GES DISC	3.82	694.1	694.1	Excellent	Ex
GSFC ➔ NSIDC	AMSR-E, MODIS, ICESAT, GBAD	38.5	8.4	MODAPS PDR ➔ NSIDC-DAAC	11.3	502.3	502.4	Excellent	Ex
GHRC ➔ NSIDC	AMSR-E	5.14	2.08	GHRC ➔ NSIDC DAAC	0.025	7.19	7.19	Good	Good
GSFC ➔ GHRC	AMSR-E, MODIS	2.9	0.00	GSFC EDOS ➔ GHRC via NISN	6.33	243.9	244.3	Excellent	Ex
NOAA ➔ GSFC	NPP	601.3	522.3	NOAA-PTH ➔ GSFC NPP-SD3E OPS1	208.7	221.6	271.5	Low	Low
GSFC ➔ Wisc	NPP, MODIS, CERES, AIRS	264.2	259.1	GSFC NPP-SD3E OPS1 ➔ WISC	144.9	1462.6	1470.5	Excellent	Ex
LaRC ➔ NCAR	MOPITT	0.044	0.044	LaRC-PTH ➔ NCAR		181.3		Excellent	Ex
GSFC ➔ JAXA	TRMM, AMSR-E, MODIS, GPM	15.4	3.5	GSFC-EBnet ➔ JAXA	10.3	n/a		n/a	n/a
JAXA ➔ GSFC	AMSR-E, GPM	3.3	0.16	JAXA ➔ GSFC-EBnet	3.7	n/a		n/a	n/a
GSFC ➔ JSpace	ASTER	16.4	6.8	GSFC-EDOS ➔ JSpace-ERSD	4.04	392.7	394.4	Excellent	Ex
JSpace ➔ EROS	ASTER	8.3	8.3	JSpace-ERSD ➔ EROS PTH	5.2	339.6	339.6	Excellent	Ex
GSFC ➔ KNMI	OMI	13.4	13.4	GSFC-OMISIPS ➔ KNMI ODPS	1.78	51.4	51.8	Excellent	Ex

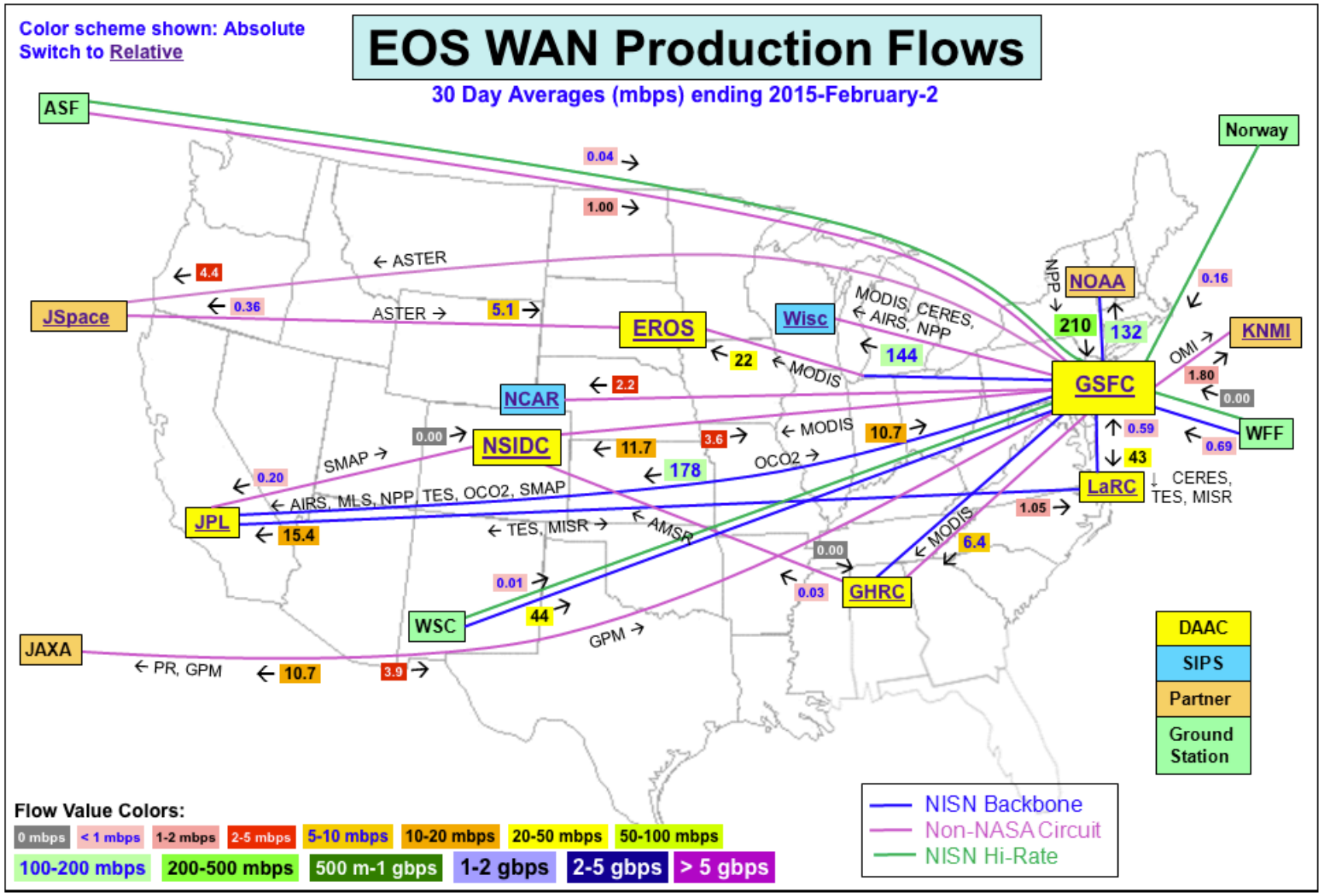
Significant change from FY '12 to FY '14

Changed in 2014 | Value used for ratings

*Criteria:		
	Excellent	**Total Kbps** > Requirement * 3
	Good	1.3 * Requirement <= **Total Kbps** < Requirement * 3
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3
	Almost Adequate	Requirement / 1.5 < **Total Kbps** < Requirement
	Low	Requirement / 3 < **Total Kbps** < Requirement / 1.5
	Bad	**Total Kbps** < Requirement / 3

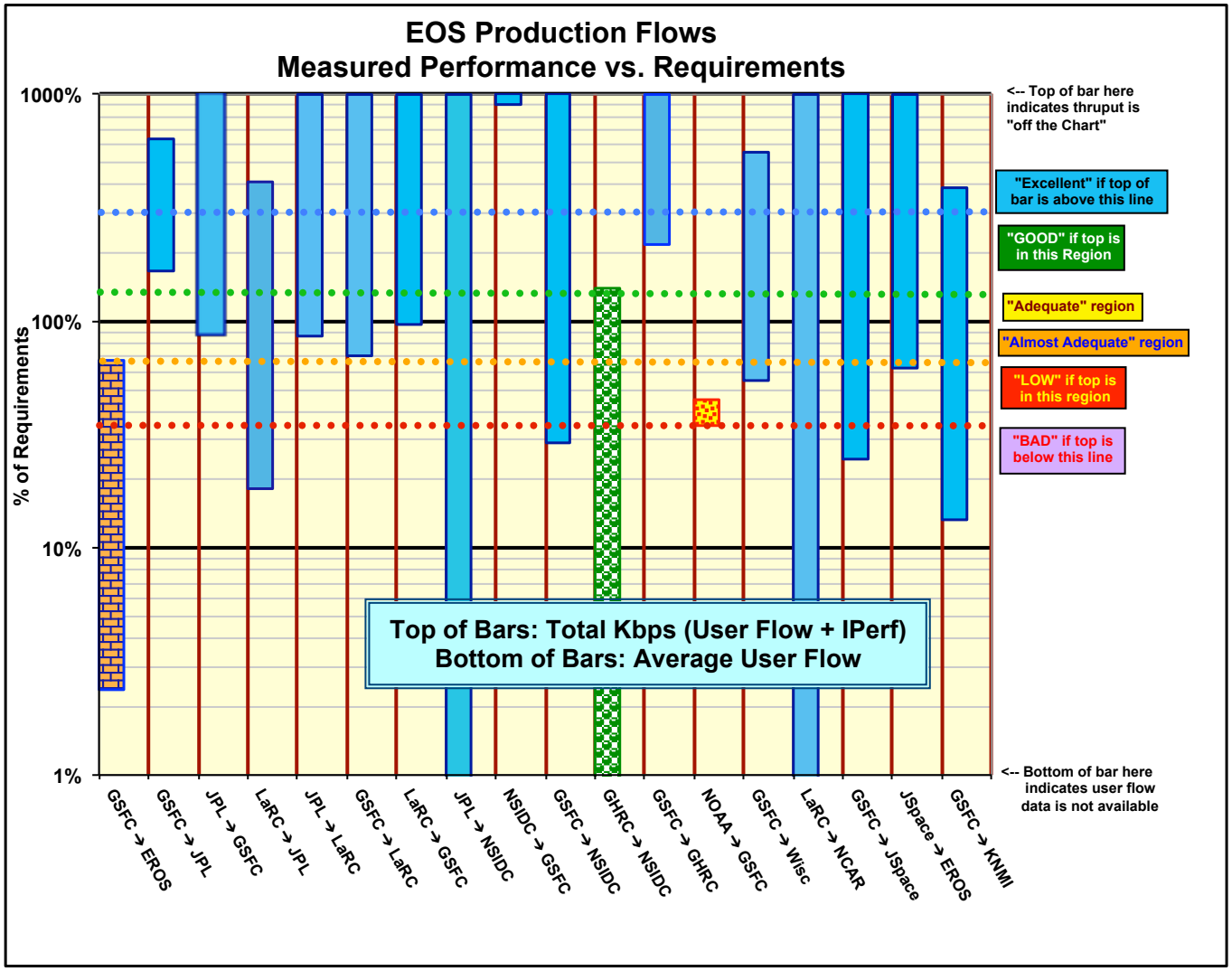
Ratings Summary	FY '15 Req Score	FY '15 Req Prev
Excellent	15	15
Good	1	1
Adequate	0	0
Almost Adequate	1	0
Low	1	2
Bad	0	0
Total Sites	18	18
GPA	3.64	3.61

Notes: Flow Requirements include:
TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP, GPM, SMAP, OCO2



This chart shows the averages for the main EOS production flows for the current month. **Closed side flows were not available this month.** Up to date flow information can be found at http://ensight.eos.nasa.gov/Weather/web/hourly/Production_Flows-A.shtml

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value (when available) is used to determine the ratings.



1) EROS:

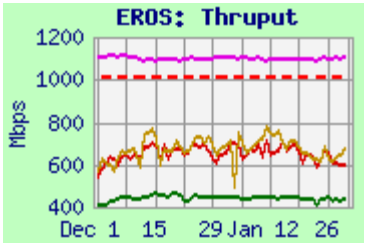
Ratings: GSFC → EROS: ↑ Low → Almost Adequate
JSpace → EROS: Continued Excellent

1.1 GSFC → EROS:

Web Pages: http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

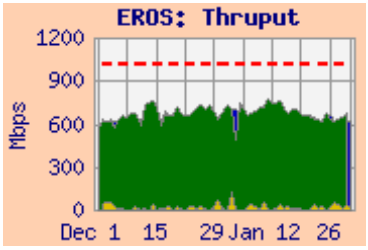
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
MODAPS-PDR→ EROS LPDAAC	755.6	683.8	418.7	24.2	683.8
GSFC-EDOS → EROS LPDAAC	452.1	442.4	344.4		
GES DISC → EROS LPDAAC	758.7	652.6	410.2		
GSFC-ENPL → EROS LPDAAC	1108.0	1098.0	871.0		
GSFC-ENPL → EROS PTH	2126.2	2065.5	1287.3		
GSFC-ENPL → EROS PTH (IPv6)	n/a	n/a	n/a		
GSFC-NISN → EROS PTH	808.5	357.2	57.1		
ESDIS-PS → EROS PTH	850.8	744.0	476.7		



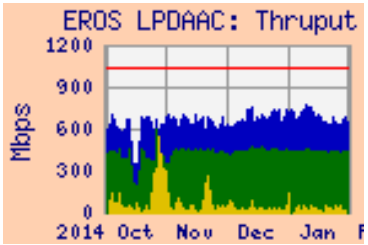
Requirements:

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	8/14	1016.1	49.8	↑ Almost Adq



Comments: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow.

The reprocessing flow requirement began in August, so the requirement increased to 1016.1 mbps (was only 49.8 mbps previously). Note from the integrated graph that the flow actually increased in late October – the peaks were about 40% of the requirement (including reprocessing). But the user flow this month averaged only 24.2 mbps – the same as last month's 24.1 mbps, and only about 2.4% of the requirement.

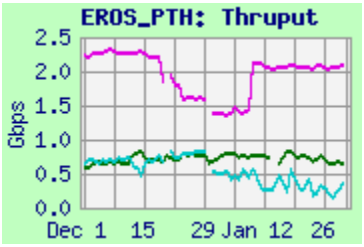


Thruput from all sources was stable this month. The median integrated thruput from MODAPS-PDR to LPDAAC increased slightly, and improved to slightly above 2/3 of the new requirement (which includes reprocessing), so the rating improves to **Almost Adequate**

The median thruput from **GSFC-EDOS** and **GES DISC** (also on EBnet) was also stable this month,.

The route from EBnet sources is via the Doors, to the NISN 10 gbps backbone, to the NISN Chicago CIEF, then via a NISN GigE, peering at the StarLight Gigapop with the EROS OC-48 (2.5 gbps) tail circuit.

1) EROS: (continued)



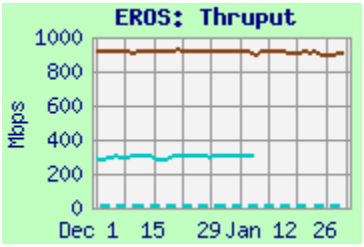
Iperf testing for comparison is performed from **GSFC-ENPL** to both LPDAAC (the "FTL" node, outside the EROS firewall) and to EROS-PTH (both 10 gig hosts). The route from **GSFC-ENPL** to EROS is from GSFC via a direct 10 gig connection to the MAX, to the Internet2 100 gbps backbone, to StarLight in Chicago, then via the EROS OC-48 (2.5 gbps) tail circuit. **GSFC-ENPL** (IPv4) to EROS-PTH now typically gets over 2 gbps. This shows that the capacity of this network is well in excess of the requirement (including reprocessing) – it would be rated **Good**. EROS has not been configured for IPv6 since February 2014.

Additional Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
JSpace-ERSD→ EROS LPDAAC	315.2	306.9	272.4	5.18	306.9
JSpace-ERSD → EROS PTH	342.7	339.6	111.9		
NSIDC SIDADS→ EROS PTH	916.8	912.8	881.4		
LaRC PTH→ EROS PTH	186.9	186.3	185.5		

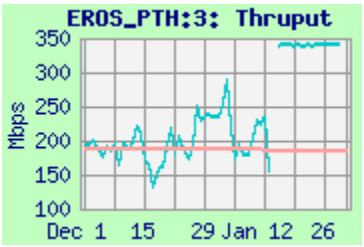
Requirements:

Source → Dest	Date	mbps	prev	Rating
ERSDAC → EROS	FY '06 –	8.3	8.3	**Excellent**



1.2 JSpace-ERSD → EROS: **Excellent**. See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance was stable and excellent this month.



1.4 LaRC → EROS-PTH: The route from LaRC-PTH is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Performance was stable this month, similarly to the other NISN sources. Note that LaRC-PTH has a 200 mbps outflow limitation.

2) to GSFC
2.1) to NPP, GES DISC, etc.

Ratings: JPL → GSFC: Continued **Excellent**
NSIDC → GES DISC: Continued **Excellent**
LDAAC → GES DISC: Continued **Excellent**
NOAA → NPP SD3E: Continued **Low**

Web Pages:

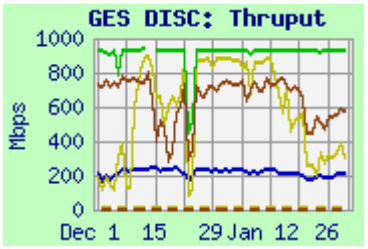
http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtml
http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

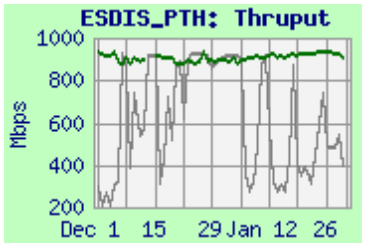
Test Results:

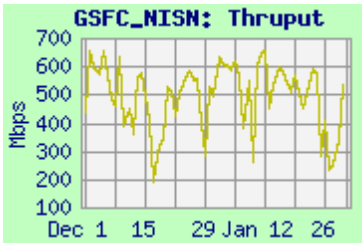
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
EROS LPDAAC → GES DISC	249.3	211.2	132.8		
EROS PTH → GSFC-ESDIS PTH	919.0	480.5	174.0		
JPL-PODAAC → GES DISC	871.8	569.4	197.0	10.6	
JPL-PTH → GSFC-NISN	707.1	539.0	192.4		
NSIDC DAAC → GES DISC	784.0	694.1	532.7	3.8	
NSIDC DAAC → GSFC-ISIPS (scp)	31.4	30.7	25.2		
LaRC ASDC → GES DISC	936.1	933.9	807.7	0.59	
LARC-ANGe → GSFC-ESDIS PTH	933.8	916.8	855.5		
NOAA-PTH → NPP-SD3E-OPS1	227.9	221.6	212.1	208.7	271.5

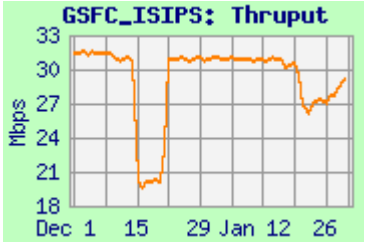
Requirements:

Source → Dest	Date	FY '15	FY '12	Rating
JPL→ GSFC combined	FY '15 –	11.9	0.57	Excellent
NSIDC → GSFC	FY '15 –	0.009	0.017	Excellent
LaRC ASDC → GES DISC	CY '12 –	0.6	0.6	Excellent
NOAA → NPP SD3E	FY '15 –	601.3	522.3	Low









Comments:

2.1.1 EROS LPDAAC, EROS-PTH → GSFC: The thruput for tests from **EROS LPDAAC** to GES DISC and from **EROS-PTH** to ESDIS-PTH were again noisy, with the PTH's getting better results than the DAACs.

2.1.2 JPL → GSFC: Thruput from **JPL-PODAAC** to GES DISC remains noisy. Note that JPL campus nodes → EBnet flows take Internet2 instead of NISN, based on JPL routing policies. Thruput was well above 3 x the requirement, so the rating remains **Excellent**. The 10.6 mbps average user flow was below the 19 mbps last month. It is now very close to the new requirement (with contingency).

Testing from **JPL-PTH** to GSFC-NISN is routed via NISN PIP, and is also noisy.

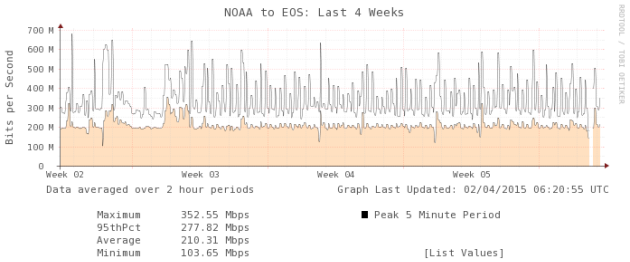
2.1.3 NSIDC → GSFC: Performance from **NSIDC** to GES DISC remained way above the tiny requirement, so the rating remains **Excellent.** The user flow was again well above both the old and lower new requirement.

Thruput to **GSFC-ISIPS** using SCP remains well above the requirement.

2.1) to NPP, GES DISC continued.

2.1.4 LaRC → GSFC: Performance from both **LaRC ASDC** to GES DISC and **LaRC ANGe** to ESDIS-PTH was very stable this month. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was very close to the requirement.

2.1.5 NOAA → NPP-SD3E: Performance from **NOAA-PTH** to GSFC NPP-SD3E-OPS1 dropped dramatically in early November. The user flow was close to usual, at about 40% of the requirement (with contingency), and appeared unaffected, leading to the inference that the problem was with the test node, not the network.

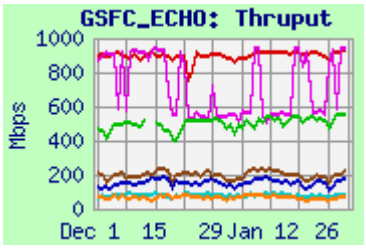


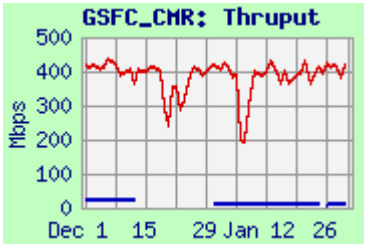
2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	194.2	156.3	105.9
EROS LPDAAC ftp	115.4	78.7	27.6
GES DISC	933.8	911.9	842.9
GES DISC ftp	941.2	566.4	492.3
LaRC ASDC DAAC	565.4	518.0	415.5
NSIDC DAAC	236.3	200.6	143.9
NSIDC DAAC ftp	107.0	68.4	27.0
EROS LPDAAC → CMR	9.9	9.8	9.3
GES DISC → CMR	428.8	395.3	338.3





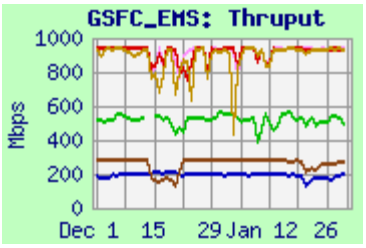
Comments: Performance was mostly stable from all sources. FTP performance is mostly limited by TCP window size – especially from sites with long RTT. Testing to the "Common Metadata Repository" (CMR), which will replace ECHO, was started in November. Performance is erratic – a new server software has been requested.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	205.5	197.2	95.1
ESDIS-PTH	939.0	935.6	443.8
GES DISC	937.8	935.2	724.2
LARC ASDC	572.7	522.1	308.1
MODAPS-PDR	938.6	934.4	410.3
NSIDC-SIDADS	283.8	280.8	194.6



Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only. Performance was stable from all sources.

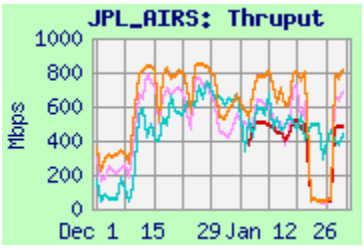
3) JPL:

3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **Excellent**

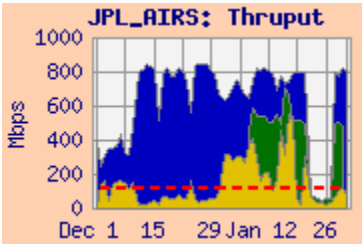
Test Results: (additional results on next page)

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
NPP-SD3E-OPS1 → JPL-AIRS	828.3	668.1	311.2	201.4	768.4
GSFC-GES DISC → JPL-AIRS	522.8	472.6	336.4		
ESDIS-PTH → JPL-AIRS	731.3	506.1	278.2		
GSFC-NISN → JPL-AIRS	761.2	495.4	61.1		
ESDIS-PTH → JPL-NISN-PTH	195.0	127.8	67.4		
NPP-SD3E-OPS1 → JPL-Sounder	822.6	637.7	315.3		
GSFC-NISN → JPL-Sounder	720.7	577.0	410.7		



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	FY '15	**121.0**	**63**	**Excellent**
GSFC → JPL AIRS	FY '15	11.4	40	**Excellent**
GSFC NPP → JPL Sounder	FY '15	15.9	15	**Excellent**
GSFC → JPL SMAP	FY '15	49.1	-	**Low**
GSFC → JPL OCO2	FY '15	36.6	-	**Excellent**
GSFC → JPL Other	FY '15	8.0	1.0	**n/a**



Comments: **3.1.1 AIRS , Overall:**

http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml

On January 22, Routing from EBnet to JPL switched from using NISN PIP to going via MAX to Internet2, to CalREN and Los Nettos. The change occurred due to MAX starting to advertise the JPL routes to Doors. The Doors preferred MAX routes at that time, since MAX is a 10 gig connection, and the NISN connection is only 1 gig. This change was requested by the SEN at GSFC, to use the Internet2 path to JPL to achieve better thruput. In response, MAX advertised the JPL routes to SEN, but also to Doors and ENPL at the same time.

While intended to improve thruput, the change had the opposite effect on most flows! So on January 27, the Doors implemented a local preference to restore the use of NISN – and performance returned to its previous level.

User flow increased this month – the 201 mbps average flow (for all EBnet to JPL flows) is well above the requirement, including contingency, and the 91 mbps last month.

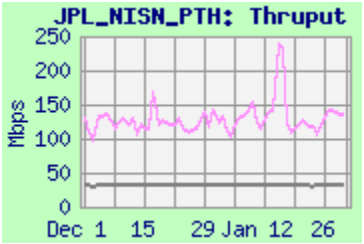
The median integrated thruput from **NPP-SD3E-OPS1** to JPL-AIRS remains well above 3 x the AIRS requirement, so the AIRS rating remains **Excellent**. Performance from **ESDIS-PTH** and **GES DISC** was similar. Note that **GSFC-NISN** does not connect through the Doors, and continued to use NISN PIP throughout this period, and its performance was unaffected.

3.1.2 The JPL overall rating is also based on the **NPP-SD3E-OPS1** to JPL AIRS thruput, compared with the sum of all the GSFC to JPL requirements. The median thruput remained well above 3 x this requirement, so the overall rating remains **Excellent**.

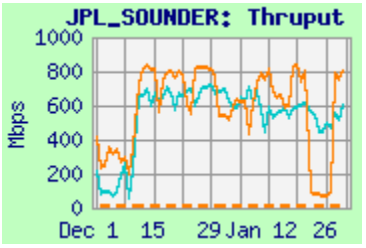
3.1.3 ESDIS-PTH to JPL-NISN-PTH:

http://ensight.eos.nasa.gov/Organizations/daac/JPL_NISN_PTH.shtml

The thruput from **ESDIS-PTH** to JPL-NISN-PTH was stable, and never used NISN PIP throughout the month, so was not subject to the performance degradation, above.



3.1) GSFC → JPL: continued



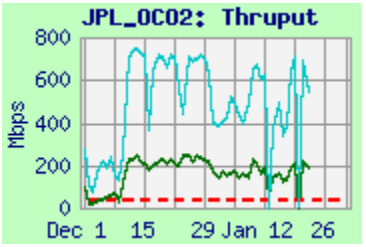
3.1.4 NPP to JPL Sounder:

http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml

Performance from **NPP-SD3E-OPS1** was stable, except for the Jan 22-29 route change, along with the other GSFC to JPL flows. Thruput was well above the requirement rating **Excellent**. The route from **GSFC-NISN** remained on the NISN PIP network, and performance was unaffected.

Test Results: continued

Source → Dest		Medians of daily tests (mbps) Best	Median	Worst	Requirement (mbps)	Rating
GSFC-EDOS → JPL-OCO2	1 stream	252.2	161.9	17.5	36.6	Excellent
	6 streams	723.2	489.3	149.6		Excellent
GSFC-EDOS → JPL-SMAP	1 stream	121.0	40.8	1.6	49	↑ Almost Adeq.
	6 streams	374.1	166.8	14.9		Excellent
ESDIS-PTH → JPL-SMAP		342.6	297.5	25.1		
ESDIS-PTH → JPL-MLS		501.9	460.4	314.7		
GSFC-NISN → JPL-MLS		529.2	510.3	443.0		

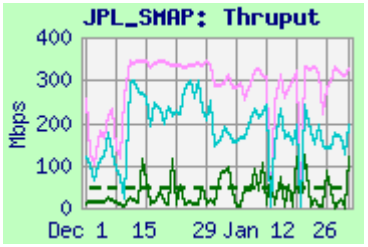


3.1.5 OCO2:

http://ensight.eos.nasa.gov/Organizations/daac/JPL_OCO2.shtml

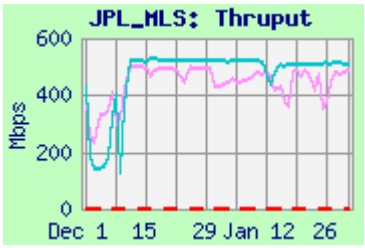
Testing from **EDOS** to OCO2 is done using both a **single stream** and **6 streams**. Performance improved and stabilized in early December, along with the other GSFC to JPL flows. The OCO2 test node was unavailable for testing during the period where the internet2 route was used (resumed in February), so the performance degradation does not appear on the graph. Median thruput from EDOS (using both single stream and 6 streams) is well above 3 x the requirement, so is rated **Excellent**.

3.1.6 SMAP: http://ensight.eos.nasa.gov/Organizations/daac/JPL_SMAP.shtml



The 49 mbps requirement from GSFC to JPL SMAP began in October, before the **SMAP launch on January 31**. Testing from **EDOS** to SMAP is done using both a **single stream** and **6 streams**. Performance from EDOS is erratic – sometimes thruput is good (300 mbps range), but frequently is less that 10 mbps. The rating with **6 streams** remains **Excellent**, but improves slightly to **Almost Adequate** with a single stream. Testing was added in December from ESDIS-PTH, with stable performance at a higher average level that from EDOS.

3.1.7 MLS:



http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml

Thruput from both ESDIS-PTH and GSFC-NISN also stabilized in early December, and was way above the modest 1.2 mbps requirement, so the rating remains **Excellent**.

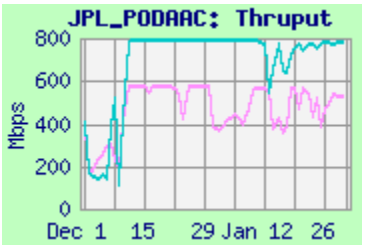
3.1) GSFC → JPL: continued

Test Results: continued

Source → Dest	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
ESDIS-PTH → JPL-PODAAC	569.0	474.7	298.6
GSFC-NISN → JPL- PODAAC	785.1	777.2	461.5
ESDIS-PS → JPL-QSCAT	92.6	92.1	88.6
GSFC-NISN → JPL-QSCAT	74.5	74.2	70.3

3.1.8 PODAAC:

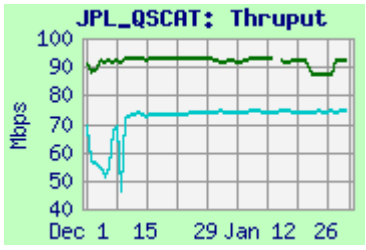
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml



There is no longer a requirement from GSFC to JPL PODAAC in the database. Performance stabilized in early December, and was not affected by the route change Jan 22-29. Thruput was way above the previous 1.5 mbps PODAAC requirement.

3.1.9 QSCAT:

http://ensight.eos.nasa.gov/Organizations/daac/JPL_QSCAT.shtml



There is no longer a requirement from GSFC to JPL QSCAT in the database. Thruput from **ESDIS-PS** and GSFC-NISN to QSCAT also stabilized in early December. Thruput from both sources remained well above the modest previous 0.6 mbps requirement.

3.2) LaRC → JPL

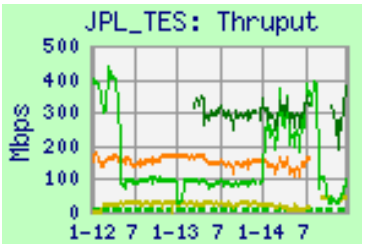
Rating: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtml
http://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml

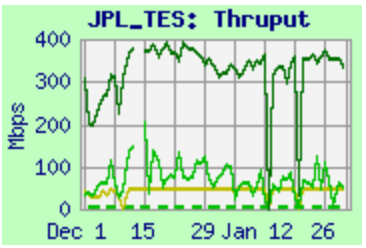
Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	User Flow
LaRC ANGE → JPL-TES	439.4	344.0	62.7	
LaRC ASDC → JPL-TES	208.4	60.8	4.0	
LaRC ANGE → JPL-PTH	294.9	252.9	24.9	15.3
LaRC PTH → JPL-PTH	181.9	181.4	85.7	

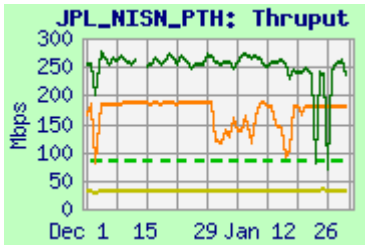


Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Excellent
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Bad
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

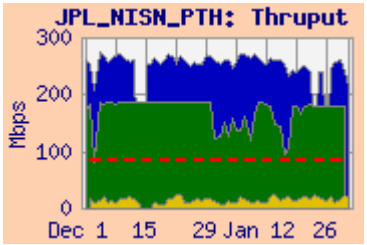


3.2.1 LaRC→ JPL (Overall, TES): Performance from LaRC ASDC to JPL TES dropped dramatically in mid August 2014. Performance from both LaRC ASDC and LaRC ANGe improved and stabilized in early December, like other NISN flows to JPL. LaRC ASDC to JPL-TES had improved dramatically in early January 2014 with the ASDC node upgrade!



The LaRC to JPL Overall rating is now based on the performance from LaRC ANGe to JPL-TES, since it more accurately shows the network capability. The median thruput remained more than 3 x the combined requirements, so the overall rating remains **Excellent**. Total LaRC to JPL user flow is about 27% of the requirement (without contingency).

The median thruput from LaRC ASDC to JPL-TES remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. User flow to TES is very low.



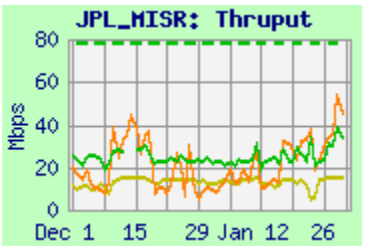
3.2.2 LaRC→ JPL-PTH: Performance from LaRC ANGe to JPL-PTH was much more stable than LaRC ASDC to JPL-TES – degradation had previously been present, but less severe than to nodes inside the JPL campus. JPL-PTH is directly connected to the NISN router, so it was not affected by the congestion between NISN and the JPL campus. Performance from LaRC-PTH stabilized a bit below its 200 mbps limitation.

3.2) LaRC → JPL (continued)

3.2.3 LaRC → JPL-MISR: http://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtml

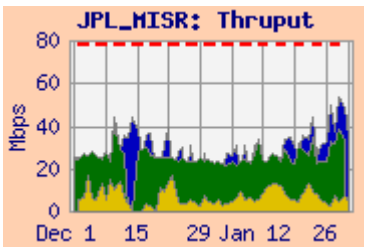
Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	User Flow
LaRC ASDC → JPL-MISR	34.7	23.0	2.9	
LaRC PTH → JPL-MISR	53.3	22.5	1.0	5.0



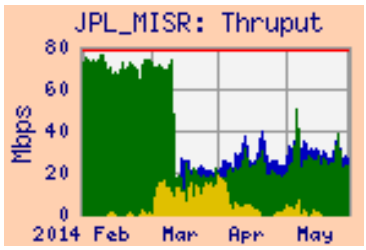
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Bad



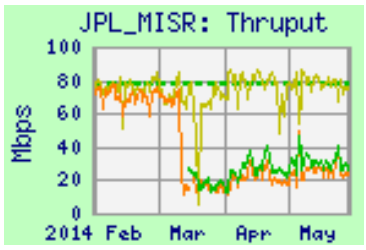
Performance from LaRC ASDC to JPL-MISR is similar to that from LaRC PTH, limited by the Fast-E connection to the MISR node. Thruput to MISR from both sources dropped severely in March 2014, after improving in December 2013.

The median integrated thruput from LaRC ASDC remained a bit below 1/3 the MISR requirement, so the MISR rating remains **Bad**. User flow was about the same as last month, and averaged only about 10% of the requirement, without contingency.



Note that there was a user flow peak, beginning in late February 2014, BEFORE the measured thruput dropped in March, suggesting that the user flow is not the cause of the thruput drop.

The LaRC → JPL Overall rating is not based on this result, however, since it not indicative of the capability of the network.



4) LaRC

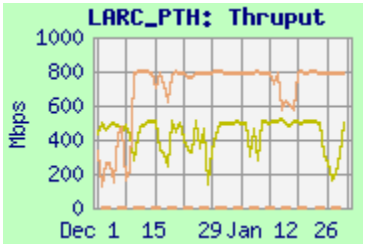
4.1) JPL → LaRC

Rating: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

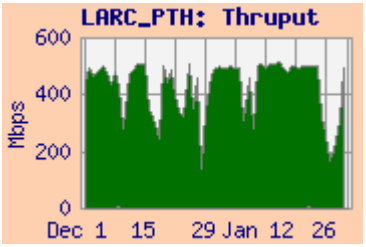
Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	User Flow
JPL-PTH → LaRC PTH	509.0	496.5	142.0	0.94
JPL-TES → LaRC PTH	804.6	791.9	293.6	



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	**Excellent**



Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. The route from JPL to LaRC is via NISN PIP. This month, performance from **JPL-TES** to LaRC-PTH was stable. Note that ARC to JPL flows were diverted off NISN in December. The thruput remained much higher than the requirement; the rating remains **Excellent**.

Thruput from **JPL-NISN-PTH** to LaRC-PTH increased at the beginning of June 2014, when **JPL-NISN-PTH** was connected to a Gig-E port on a NISN switch – previously it was limited to 100 mbps due to its connection to a Fast-E port. The thruput was stable this month, as **JPL-NISN-PTH** is not subject to NISN to JPL campus congestion.

Thruput from both JPL sources to LaRC-PTH increased again in September 2014, when LaRC-PTH was upgraded.

The JPL to LaRC integrated graph doesn't really show the 0.94 mbps user flow from JPL to LaRC this month. This is the entire NISN flow from JPL to LaRC – it may not all be EOS related. But it is consistent with the EOS requirement.

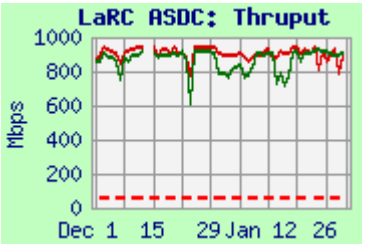
4.2) GSFC → LaRC:

Rating: Continued **Excellent**

Web Pages : http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

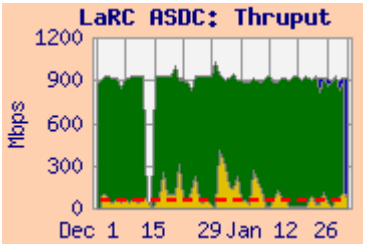
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GES DISC → LaRC ASDC	936.3	894.8	685.2	42.8	908.5
GSFC-EDOS → LaRC ASDC	925.1	895.8	610.6		
ESDIS-PTH → LaRC-ANGe	883.5	816.0	549.0		
GSFC-NISN → LaRC-ANGe	853.8	744.1	586.5		
GES DISC → LaRC-PTH	939.2	823.0	630.2		
GSFC-NISN → LaRC-PTH	932.9	802.1	688.2		
NPP-SD3E → LaRC-PTH	920.0	799.4	592.3		



Requirements:

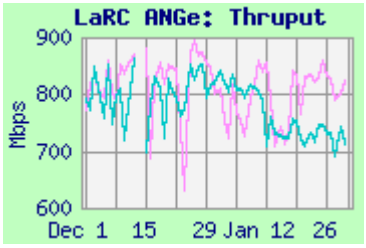
Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	60.7	52.2	Excellent



Comments:

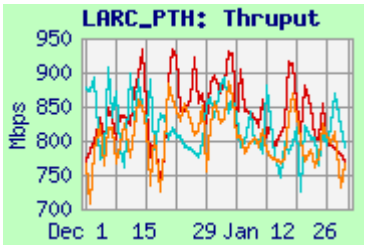
GSFC → LaRC ASDC: Thruput from **GES DISC** to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, close to the circuit limitation, so the rating remains **Excellent**. Thruput to ASDC from **GSFC-EDOS** was slightly lower and noisier.

As seen on the integrated graph, the 43 mbps average user flow this month was close to both typical and the requirement.



GSFC → ANGe (LaTIS): Testing to ANGe ("Bob") from both ESDIS-PTH and GSFC-NISN was stable, close to the circuit limitation. (Note the expanded scale on the graph).

GSFC → LaRC-PTH: Testing to LaRC-PTH from **GES DISC**, **NPP-SD3E**, and **GSFC-NISN** improved from all sources in late September when the LaRC-PTH node was upgraded. (Note the expanded scale on the graph). Performance is now similar to ASDC and ANGe.



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
GHRC → NSIDC: Continued **Good**
JPL → NSIDC: **Excellent**

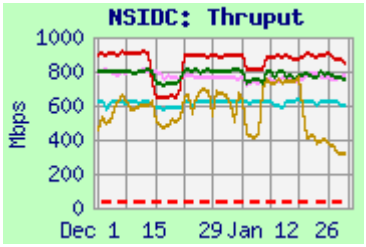
Web Pages: http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

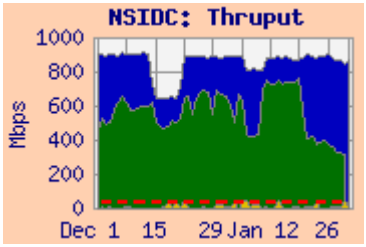
Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
MODAPS-PDR → NSIDC DAAC	657.5	502.3	260.0	11.3	502.4
GES-DISC → NSIDC DAAC	906.7	886.6	741.6		
GSFC-EDOS → NSIDC DAAC	838.5	776.6	591.0		
ESDIS-PTH → NSIDC DAAC	806.6	758.7	500.0		
GSFC-ISIPS → NSIDC (iperf)	631.2	626.9	409.7		
JPL SMAP → NSIDC DAAC	818.0	750.0	391.0	0.0007	
GHRC → NSIDC DAAC (nuttcp)	17.6	7.2	3.3	0.03	
GHRC → NSIDC DAAC (ftp pull)	35.7	6.7	2.5		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	8/14 –	38.5	16.8	Excellent
JPL → NSIDC	FY '15 –	17.1	0.16	Excellent
GHRC → NSIDC	FY '15 –	5.14	2.08	Good



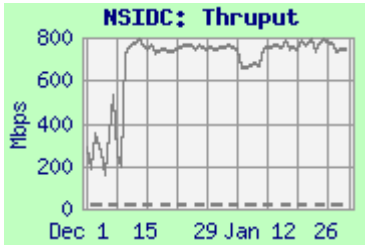


Comments: The requirements were updated in June 2014 to use the FY '14 database. AMSR-E flows from EDOS and JPL have been removed. The MODIS reprocessing flow **requirement** is now effective, although the actual flow has apparently not begun.

5.1.1 GSFC → NSIDC S4PA: The rating is based on testing from the **MODAPS-PDR** server to the NSIDC DAAC, since that is the primary flow. The median thruput from **MODAPS-PDR** remained well above 3 x the increased requirement, so the rating remains **Excellent**. The 11.3 mbps average user flow was well below the requirement – without MODIS reprocessing or contingency.

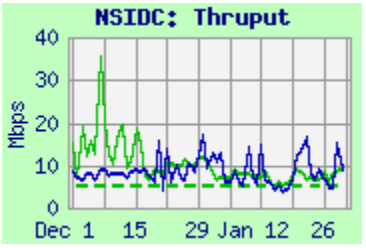
Performance from **GES-DISC**, **GSFC-EDOS**, and **GSFC-ISIPS** was less noisy and mostly stable.

5.1.2 JPL SMAP → NSIDC S4PA: There is no longer a JPL to NSIDC requirement for AMSR-E. A new 17.1 mbps flow for SMAP began in October.



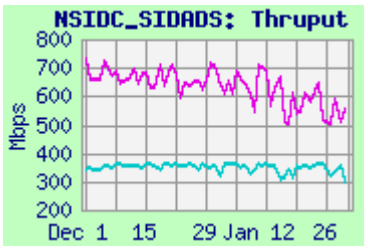
Testing to NSIDC from **JPL-SMAP** was well in excess of the SMAP requirement, rating **Excellent**. Thruput stabilized in December, like many other JPL flows. The user flow was only 0.0007 mbps this month -- well below the requirement.

5) Boulder CO sites (Continued):



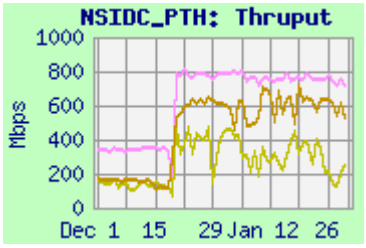
5.1.3 **GHRC, GHRC-ftp → NSIDC S4PA:** GHRC (NSSTC, UAH, Huntsville, AL) sends reprocessed AMSR-E data to NSIDC via Internet2. This requirement increased to 5.14 mbps in December '14 (was 2.08 mbps previously) – when the next reprocessing campaign began.

The median integrated thruput was again above the increased requirement, by more than 30%, but not by by 3 x, so the rating remains **Good**



Test Results: NSIDC-SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	729.0	607.5	389.0
GSFC-NISN → NSIDC-SIDADS	364.1	357.4	247.1
ESDIS-PTH → NSIDC-PTH	814.7	754.2	526.1
MODAPS-PDR → NSIDC-PTH	747.5	619.4	288.2
JPL-NISN-PTH → NSIDC-PTH	459.0	301.3	115.4



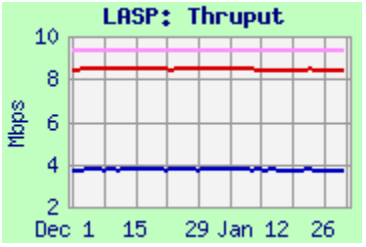
5.1.4 GSFC → NSIDC-SIDADS: Performance from GSFC-ENPL was retuned in June '14 (using 30 streams, to compensate for the small window size on SIDADS) with increased thruput. Testing from GSFC-NISN was similarly retuned in September.

5.1.5 NSIDC-PTH: Thruput from all sources to NSIDC-PTH improved in mid December, when the NSIDC-PTH machine was upgraded.

5.2) LASP:

Ratings: LASP → GSFC: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml

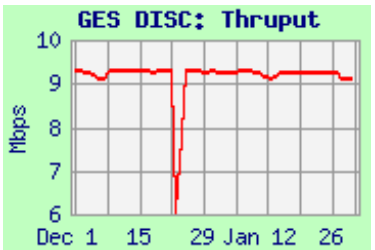


Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.78	3.74	3.41
ESDIS-PTH → LASP blue (iperf)	9.36	9.35	8.04
GES DISC → LASP blue (iperf)	8.50	8.44	7.50
LASP → GES DISC	9.24	9.23	8.76

Requirement:

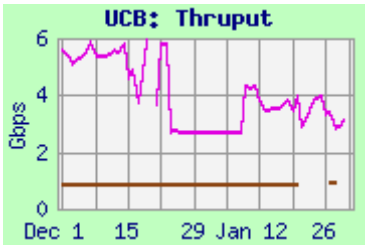
Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	Excellent



Comments: In January '11, LASP's connection to NISN PIP was rerouted to a 10 mbps connection to the NISN POP in Denver; previously it was 100 mbps from CU-ITS via NSIDC.

Performance from all sources was very stable and consistent with the circuit limitation, as was return testing from LASP to GES DISC, rating **Excellent**.

5.3) UCB: http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml



Test Results:

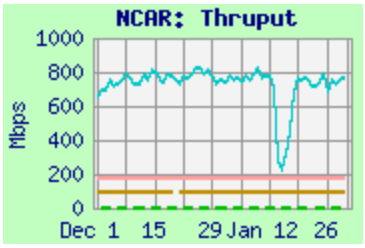
Source	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL	5168.0	3425.8	1775.7
GSFC-ESTO	854.0	846.5	799.5

Comments: Thruput from both GSFC-ENPL and GSFC-ESTO improved in early October '14, by switching back to the 10 gig connected test node at UCB (it had began failing consistently in mid-May 2013, so testing had been switched to a 1 gig test node in mid-June '13). The route is via Internet2 to FRGP, similar to NCAR.

5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
GSFC → NCAR: Continued **Excellent**

Web Pages http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml

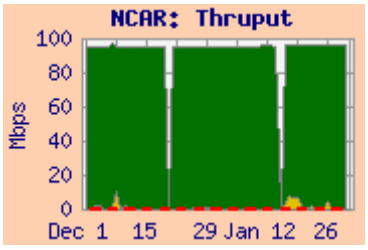


Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	181.8	181.3	159.1
GSFC-ENPL-10G	5214.8	3128.6	1112.4
GSFC-ENPL-FE	96.2	95.9	95.4
GSFC-NISN	845.9	749.1	240.2

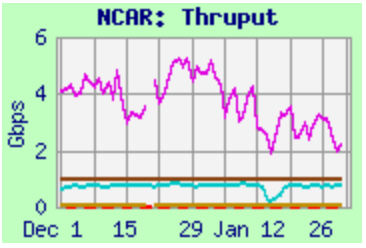
Requirement:

Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	**Excellent**
GSFC	CY '12 -	0.111	5.0	**Excellent**



Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements. Testing is to NCAR's 10 gigabit capable PerfSonar node since March '12.

From LaRC: Thruput from LaRC-PTH was very steady, and improved a bit with the LaRC-PTH upgrade in September '14. It remains limited to 200 mbps by agreement with CSO / NISN. The median remained well above 3 x the tiny requirement, so the rating remains **Excellent**.



From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). Thruput was mostly stable this month. The median was well above 3 x the tiny requirement, so the rating remains **Excellent**. The user flow from GSFC-EBnet averaged about 1.1 mbps this month, below the 1.3 mbps last month. This is well above the revised requirement, but closer to the previous requirement.

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is also noisy, but averages over 3 gbps, and gets over 5 gbps on peaks.

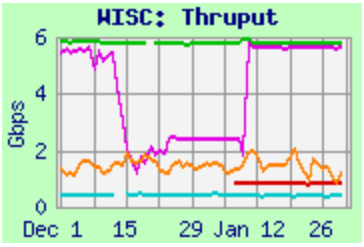
6) Wisconsin:

Rating: Continued **Excellent**

Web Pages http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml

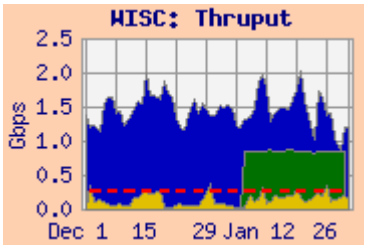
Test Results:

Source Node	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
NPP-SD3E	2004.0	1462.6	203.5	144.9	1470.5
GES DISC	850.6	839.3	582.8		
GSFC ENPL	5674.9	5620.2	4649.5		
GSFC-ENPL-v6	5837.9	5813.5	5624.6		
LaRC ANGe	462.6	414.5	254.0		



Requirements:

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	FY'14 -	242.3	237.2	Excellent
GSFC MODAPS	FY'14 -	21.9	16.5	Excellent
GSFC Combined	FY'14 -	264.2	253.7	Excellent
LaRC Combined	CY'12 -	n/a	7.9	n/a



Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to act as an SCF on the MODIS, CERES and AIRS teams.

GSFC: Testing from **NPP-SD3E** was switched to Wisconsin's 10 gig server in May 2013, with initial thruput usually close to 2 gbps! The median integrated thruput from **NPP-SD3E** remained above the NPP requirement by more than 3 x, so the NPP rating remains **Excellent**. It was also above the GSFC combined requirement by more than 3 x, so the combined rating also remains **Excellent**.

User flow was consistent to the requirement, similar to last month.

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

Testing from **GSFC-ENPL** was switched to the 10 gig server at Wisconsin (SSEC) in March 2013. Due to problems, testing was switched to a backup server in September '14, with reduced results, back to the 10 gig server in early October, and to the backup server again in December.

Testing from **GSFC-ENPL** using IPv6 was added in late November '14. Its performance was very stable and slightly better than IPv4 performance.

Testing from **GES DISC** began failing in November, and was restored in January. Thruput was stable and close to the circuit limit.

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. In April 2013, testing from **LaRC ANGe** was switched to the new SSEC 10 gig server; performance improved at that time. Thruput from **LaRC ANGe** was stable, and remains well above the previous 7.9 mbps requirement; it would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago.

7) KNMI:

Rating: Continued **Excellent**

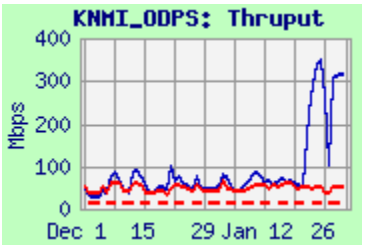
Web Page http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml

Test Results:

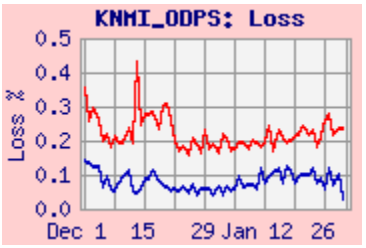
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
OMISIPS → KNMI-ODPS	73.5	51.4	33.9	1.8	51.8
GSFC-ENPL → KNMI-ODPS	238.0	70.9	34.2		

Requirements:

Source Node	Date	mbps	Prev	Rating
OMISIPS	CY'12 -	13.4	0.03	Excellent

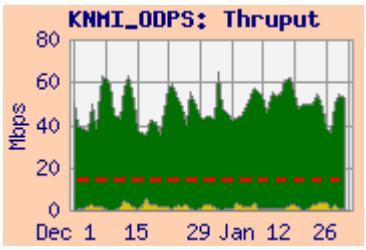


Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2+ x 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam.



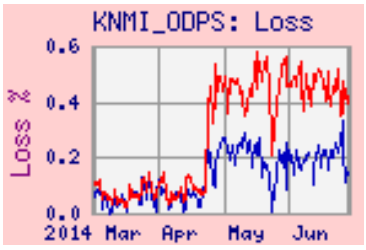
The requirement was increased with the use of the FY'14 database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

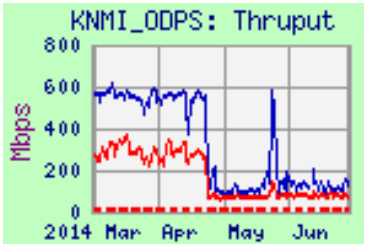
The rating is based on the results from **OMISIPS** on EBnet at GSFC to the ODPS primary server at KNMI. Thruput from both sources was stable until near the end of April 2014, when it dropped significantly, due to increased packet loss. **Thruput from GSFC-ENPL improved dramatically in mid-January** – with no apparent change in packet loss, or change in performance from **OMISIPS.**



The median thruput remains above 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 1.8 mbps this month, similar to recent months, but only 13% of the revised requirement.





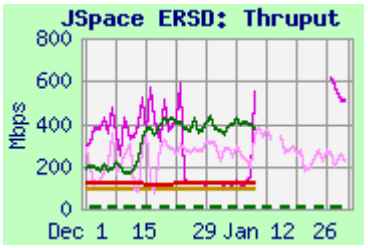
8) JSpace - ERSD:

Ratings: **GSFC → ERSD:** Continued **Excellent**
ERSD → EROS: Continued **Excellent**
ERSD → JPL-ASTER-IST: N/A

Web Page: http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml

US ←→ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GSFC-EDOS → JSpace-ERSD	503.7	392.7	147.7	4.0	394.4
GES DISC → JSpace-ERSD	126.0	121.3	50.7		
GSFC ENPL (FE) → JSpace-ERSD	92.0	91.8	91.6		
GSFC ENPL (GE) → JSpace-ERSD	209.0	128.0	65.9		
GSFC ESDIS-PTH → JSpace-New	419.3	266.9	70.6		
JSpace-ERSD → EROS	315.2	306.9	272.4	5.2	306.9
JSpace-New → EROS-PTH	342.7	339.6	111.9		
JSpace-ERSD → JPL-TES	198.0	82.0	12.7		



Requirements:

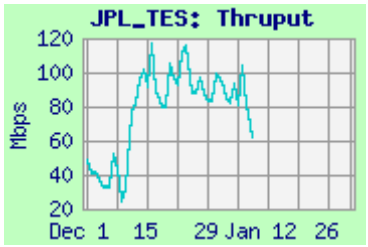
Source → Dest	CY	Mbps	Prev	Rating
GSFC → JSpace-ERSD	'14 -	16.4	6.75	Excellent
JSpace-ERSD → JPL-ASTER IST	'12 -	0.31	0.31	Excellent
JSpace-ERSD → EROS	'12 -	8.33	8.3	Excellent

Comments: **8.1 GSFC → JSpace-ERSD:** The old server at JSpace-ERSD was retired in early January. The testing to the new server was initially only from ESDIS-PTH. Testing to the new server was added from **GSFC ENPL** in late January (and from **GSFC-EDOS** and **GES DISC** in February).

Performance to the new server at ERSD from ESDIS-PTH was well above the requirement, rating **Excellent**.

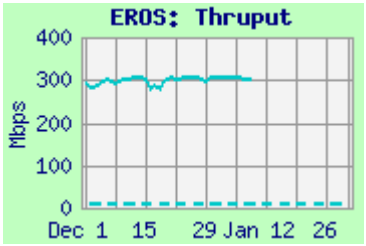
The 4 mbps user flow from GSFC to JSpace-ERSD was a little below normal this month, and also below the increased requirement without contingency.

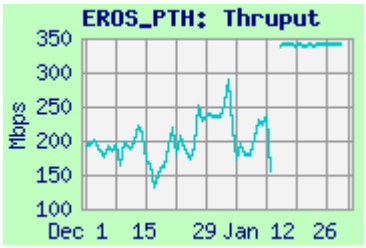
8.2 JSpace-ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October 2012. JPL no longer uses a distinct IST; instead, JPL personnel log in directly to the IST at JSpace-ERSD. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES improved, but were again noisy this month; the rating would remain **Excellent .**



8.3 JSpace-ERSD → EROS: Thruput was very stable and remains well above the requirement, so the rating remains **Excellent**. The 5.2 mbps user flow this month was close to the requirement, without contingency.

Testing from the new server at **JSpace** was initiated to EROS-PTH in October. Performance was retuned in January. And stabilized higher than previously -- it would be rated **Excellent**.





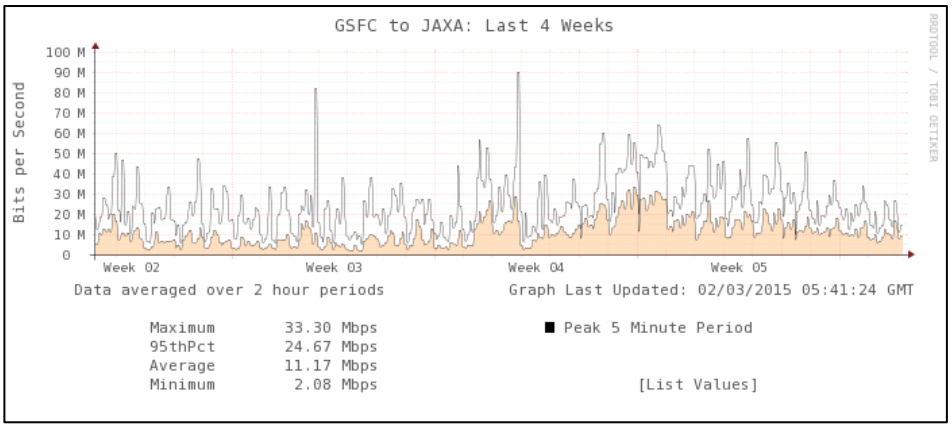
10) GSFC ←→ JAXA

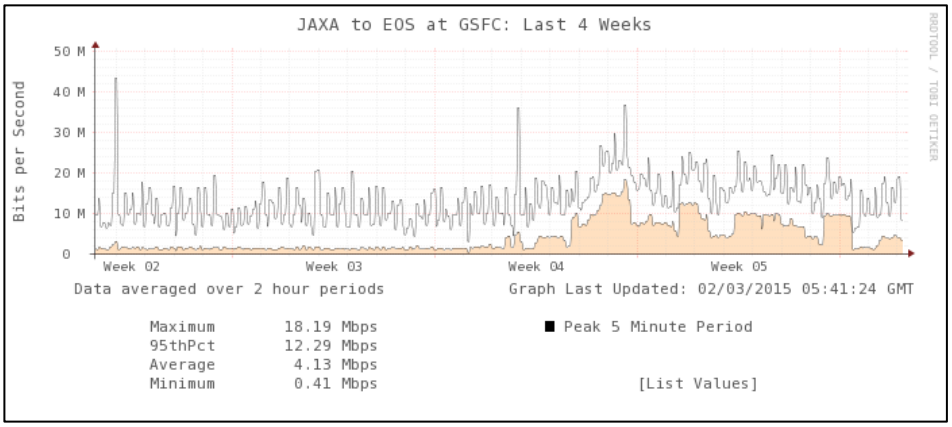
Ratings: GSFC → JAXA: N/A
JAXA → GSFC: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009. No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. Tests have been conducted with JAXA to evaluate different file transfer protocols for GPM -- but those results are not suitable for this report.

However, the user flow between GSFC-EBnet and JAXA continues to be measured. As shown below, the user flow this month averaged 10.3 mbps from GSFC-EBnet to JAXA, and 3.7 mbps from JAXA to GSFC-EBnet.

These values are more or less consistent with the new database requirements of 15.4 mbps from GSFC to JAXA, and 3.3 mbps from JAXA back to GSFC (The AMSR-E requirement from JAXA to JPL has been removed, due to AMSR-E failure). However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.





For comparison, testing is performed from GSFC to a test node at the Tokyo Exchange point, which is on the route from GSFC to JAXA. Performance to the Tokyo-XP 10 gig server is well in excess of the JAXA requirements.